

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Withdrawn): A plasma processing method for monitoring an operating status of a plasma processing apparatus and/or a processing status of an object being processed, based on a result of analyzing light emitted from a plasma generated while the plasma processing apparatus performs a plasma process on the object in a processing chamber, the plasma processing method comprising the steps of:

obtaining an emission spectrum emitted from the plasma as optical data when the plasma process is performed on the object;

obtaining quantitative data of each emission source from the obtained optical data by using reference data in a database storing therein emission spectra of a plurality of emission sources as the reference data; and

estimating the operating status of the plasma processing apparatus and/or the processing status of the object being processed, based on changes in the quantitative data of said each emission source.

Claim 2 (Withdrawn): The plasma processing method of claim 1, wherein the database is created in advance by the following steps of: obtaining as optical data an emission spectrum emitted from a plasma during a plasma process performed under a plurality of process conditions; and separating the optical data into the emission spectra of the plurality of emission sources by a multivariate analysis and storing the separated emission spectra thereof as reference data.

Claim 3 (Withdrawn): The plasma processing method of claim 2, wherein the multivariate analysis is an independent component analysis, and the emission spectra of the

emission sources correspond to independent components obtained by the independent component analysis.

Claim 4 (Withdrawn): The plasma processing method of claim 3, wherein the number of the independent components obtained by the independent component analysis is greater than or equal to the number of process gas species used in the plasma process.

Claim 5 (Withdrawn): The plasma processing method of claim 1, wherein the database is created by a separate database creating unit other than a plasma processing apparatus for performing an actual plasma process.

Claim 6 (Withdrawn) The plasma processing method of claim 1, wherein the step for obtaining the quantitative data of said each emission source includes determining inner product values between the optical data of the emission spectrum obtained by the plasma process and the reference data of each of the emission sources stored in the database, and setting the inner product values as quantitative data of each of the emission source.

Claim 7 (Withdrawn): The plasma processing method of claim 1, wherein the step for estimating the operating status of the plasma processing apparatus includes estimating that the operating status of the plasma processing apparatus is stable when the quantitative data of said each emission source become stable after the plasma processing apparatus performs the plasma process.

Claim 8 (Withdrawn): The plasma processing method of claim 1, wherein the step for estimating the processing status of the object being processed includes estimating a

completion of the plasma process for the object based on changes in the quantitative data of said each emission source.

Claim 9 (Currently Amended): ~~A plasma processing~~ A status monitoring apparatus for monitoring an operating status of a plasma processing apparatus and/or a processing status of an object being processed, based on a result of analyzing light emitted from a plasma generated while the plasma processing apparatus performs a plasma process on the object in a processing chamber, the ~~plasma processing~~ status monitoring apparatus comprising:

a unit ~~for obtaining~~ configured to obtain an emission spectrum emitted from the plasma ~~as optical data~~ when the plasma process is performed on the object;

a unit ~~for obtaining~~ configured to obtain quantitative data ~~of~~ for each of a plurality of emission sources ~~from the obtained optical data~~ emission spectrum by using reference data in a database storing therein an emission spectra of a plurality of spectrum for each of the emission sources as the reference data, wherein the unit configured to obtain the quantitative data determines an inner product value between the emission spectrum obtained by the plasma process and the reference data, and sets the inner product value as the quantitative data; and

a unit ~~for estimating~~ configured to estimate the operating status of the plasma processing apparatus and/or the processing status of the object being processed, based on changes in the quantitative data ~~of said~~ for each of the emission sources.

Claim 10 (Currently Amended) The ~~plasma processing~~ status monitoring apparatus of claim 9, wherein the database is created in advance by ~~the following steps of:~~ a unit configured to obtain ~~obtaining as optical data an~~ a set of emission spectra, each emission

spectrum of the set being emitted from a plasma during ~~[[a]]~~ each plasma process performed under ~~a plurality of~~ various process conditions; and

a unit configured to separate ~~separating~~ the ~~optical data set of emission spectra~~ into the emission ~~spectra~~ spectrum for each of the ~~plurality of~~ emission sources by a multivariate analysis and ~~storing to store~~ the separated emission ~~spectra thereof as~~ spectrum as the reference data.

Claim 11 (Currently Amended): The ~~plasma processing~~ status monitoring apparatus of claim 10, wherein the multivariate analysis is an independent component analysis, and the emission ~~spectra~~ spectrum for each of the emission sources corresponds to an independent component~~[[s]]~~ obtained by the independent component analysis.

Claim 12 (Currently Amended): The ~~plasma processing~~ status monitoring apparatus of claim 11, wherein the number of ~~[[the]]~~ independent components obtained by the independent component analysis is greater than or equal to the number of process gas species used in the plasma process.

Claim 13 (Currently Amended): The ~~plasma processing~~ status monitoring apparatus of claim 9, wherein the database is created by a separate database creating unit other than a plasma processing apparatus for performing an actual plasma process.

Claim 14 (Cancelled)

Claim 15 (Currently Amended) The ~~plasma processing~~ status monitoring apparatus of claim 9, wherein the unit configured to estimate ~~for estimating~~ the operating status of the

plasma processing apparatus estimates that the operating status of the plasma processing apparatus is stable when the quantitative data ~~of said~~ for each of the emission sources become stable after the plasma processing apparatus begins to perform the plasma process.

Claim 16 (Currently Amended): The ~~plasma processing~~ status monitoring apparatus of claim 9, wherein the unit configured to estimate ~~for estimating~~ the processing status of the object being processed estimates a completion of the plasma process for the object based on changes in the quantitative data ~~of said~~ for each of the emission sources.

Claim 17 (New): A status monitoring apparatus for monitoring an operating status of a plasma processing apparatus and/or a processing status of an object being processed, based on a result of analyzing light emitted from a plasma generated while the plasma processing apparatus performs a plasma process on the object in a processing chamber, the status monitoring apparatus comprising:

means for obtaining an emission spectrum emitted from the plasma when the plasma process is performed on the object;

means for obtaining quantitative data for each of a plurality of emission sources from the obtained emission spectrum by using reference data in a database storing therein an emission -spectrum for each of the emission sources as the reference data, wherein the means for obtaining the quantitative data determines an inner product value between the emission spectrum obtained by the plasma process and the reference data, and sets the inner product value as the quantitative data; and

means for estimating the operating status of the plasma processing apparatus and/or the processing status of the object being processed, based on changes in the quantitative data for each of the emission sources.

Claim 18 (New): The status monitoring apparatus of claim 17, wherein the multivariate analysis is an independent component analysis, and the emission spectrum for each of the emission sources corresponds to an independent component obtained by the independent component analysis.

Claim 19 (New): The status monitoring apparatus of claim 18, wherein the number of independent components obtained by the independent component analysis is greater than or equal to the number of process gas species used in the plasma process.